



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/567,438

02/07/2006

Ernest Grimberg

31322

5035

67801

7590

08/02/2011

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.

P.O. BOX 16446

ARLINGTON, VA 22215

EXAMINER

GREEN, YARA B

ART UNIT

PAPER NUMBER

2884

MAIL DATE

DELIVERY MODE

08/02/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,438	GRIMBERG, ERNEST	
	Examiner	Art Unit	
	YARA GREEN	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 62-64,66-72,74,76-81 and 84 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 62-64,66-72,74,76-81 and 84 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :3/30/2011,4/13/2011,6/6/2011,7/27/2011.

DETAILED ACTION

This Office Action is in response to Applicant's Amendment filed May 25, 2011. Claims 62, 68, 74, and 79 have been amended. No claims have been added. Claims 1-61, 65, 73, 75, and 82-83 were previously canceled. Currently, claims 62-64, 66-72, 74, 76-81 and 84 are pending.

Response to Arguments

1. Applicant's arguments filed have been fully considered but they are not persuasive. Applicant asserts that the combined references fail to teach positioning the shutter between the optics of the camera and the IR detector. The Examiner politely disagrees. The Applicant attempts to distinguish the configuration of Tsuchimoto in which the optical path comprises lenses (optics), a shutter, and then a detector which places the shutter between the camera optics and the detector. However, the Examiner fails to see the difference between Tsuchimoto and the newly added limitation, particularly when Applicant's arguments specifically state that the "shutter is located between the detector and the optics) (see Tsuchimoto, Figure 1: 1a - lens; 3 - shutter; 6 - sensor; the claim language does not preclude the prior art from disclosing additional components, such as lenses 1b). In view of the aforementioned arguments, the previous rejection is repeated and maintained below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

Art Unit: 2884

skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 62-64, 66-69, 71-72, 74, 76-80, and 84** are rejected under 35 U.S.C. 103(a) as being unpatentable over Butler (US 2002/0074499; published June 20, 2002) and Tsuchimoto et al. (US 5,994,701; published November 30, 1999) and Marshall et al. (US 6,515,285; filed February 11, 2000).

Re **claims 62 and 74**, Butler discloses an infrared imaging camera comprising (para. 0005, 0010):

an uncooled and unshielded detector comprising an array of infrared sensor arranged to detect infrared radiated energy (para. 0028, 0031),

a non-uniformity corrector, associated with said detector, operable to perform non-uniformity correction on output of said arrays to provide uniform outputs having a uniform response to energy detected at said uncooled sensor (para. 0028-0029).

As Applicant correctly notes, Butler does not teach a separate function with the calibrator that corrects the object temperature further by incorporating a temperature measurement by a sensor on the shutter and imaging the shutter. Instead, Butler uses the shutter information to correct non-uniformities amongst the detector elements.

Butler further teaches where such calibration involves a reference for deriving a reference temperature indicative of radiated energy not from an external scene and for approximating a temporal drift of local temperature and correcting the signal representative of the temperature of objects in the radiometer's field of view (para. 0057-0063).

In a similar field of endeavour, Tsuchimoto et al. disclose a calibrating an infrared detector array by implementing a calibrator to carry out periodic calibrations (col. 9, lines 15-25) of a temperature of a shutter of said camera while said shutter is closed, using a first temperature located

Art Unit: 2884

on said shutter (col. 7, lines 30-35) and to derive from said at least one calibration temperature measurement a reference temperature indicated of radiated energy not from an external scene (col. 8, lines 7-60) and a reference level comprising a reference level comprising the signal of the said IR sensors at the time of said calibration measurement (col. 9, lines 20-30), and to calculate a temperature of objects in said camera's field as a function of said calibration measurements where the reference temperature serves as an offset (col. 9, lines 50-55).

Tsuchimoto et al., however, do not explicitly disclose implementing an average video signal of the sensor array. Tsuchimoto et al. disclose the sensor measuring the radiation that does not come from the scene or the shutter in order to correct for output signals (col. 9, lines 20-30). The radiation measurements are disclosed generally as an output Q that used in the offset corrections (col. 7, lines 55-65; col. 8, lines 15-60). Since this output represents the entire sensor array and represents the temperature of the internal camera parts (as in the Instant Application), the skilled artisan would consider such an output to represent the average output of the sensor. Furthermore, Tsuchimoto et al. disclose placing the shutter between the camera optics and said detector (Figure 1). Alternative mathematical operations of the pixel outputs (subtraction, addition, etc) would not accurately represent the sensor output relating to radiation not from the scene.

Alternatively, in a similar field of endeavour, Marshall et al. disclose calculating an offset to be used in calibration to account for temperatures within the camera by averaging the signals of the detector array (col. 14, lines 58-64). The skilled artisan would have been motivated to implement averaging the video signals of Marshall et al. in the method Tsuchimoto et al. in order to provide the reference level of the camera that accounts for the interior of the camera.

In *KSR*, the court held that application of a known technique to a piece of prior art ready for improvement yields obvious predictable results. *KSR Int'l. Co. v. Teleflex* 82 USPQ2d 1385, 1396 (US

Art Unit: 2884

2007). The skilled artisan would look to the teachings of Tsuchimoto et al. in the apparatus of Butler in order to further correct errors in temperature measurements by the infrared detectors of an external scene. The application of the Tsuchimoto et al.'s calibration is a known technique that is recognized as part of the ordinary capabilities of one skilled in the art so that both non-uniformity corrections as well as ambient temperature/sensor measurements may be used to calculate the actual temperature of an external scene. Butler further discloses using a same signal function for each of said sensors (para. 0057, 0068, 0026-0027).

Re **claims 63, 64, and 76**, Butler, as modified by Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62 and 74, as mentioned above. Tsuchimoto et al. further disclose combining a value from the initial calibration temperature measurement with a second value taken from a second calibration temperature measurement, said combining using a time-dependent function, to produce interpolations of said reference temperature from recent calibration measurements (col. 10, lines 10-55). While Tsuchimoto et al. do not

Re **claim 66**, Butler, as modified Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Butler further discloses wherein the calibrator is further configured to measure a respective second reference temperature during an external temperature measurement using a second sensor located on a housing of said camera, wherein said respective second reference temperature is a further parameter of said signal to temperature function for said external temperature measurement (para. 0026-0027, 0035).

Re **claims 67 and 72**, Butler, as modified Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Butler discloses wherein the calibration measurements are made at intervals less than the thermal time constant of the camera (para. 0055, 0056). It follows

Art Unit: 2884

that repeated measurements during the changing temperature of the camera falls within the thermal time constant of the camera.

Re **claim 68**, Butler, as modified by Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Tsuchimoto et al. further disclose locating a sensor on the shutter to effectuate calibration based on shutter temperature (col. 8, lines 39-45) Furthermore, Butler teaches wherein a sensor is located external to the surface of the vacuum packaging and a sensor is located on a case surrounding the optics of the camera (para. 0027). Butler is silent with regards to the type of sensor used for temperature measurement, thereby allowing for that which is well known in the art. Tsuchimoto et al. teach thermistors to be suitable sensors for measuring the temperature of a desired area of an infrared camera (col. 2, lines 40-52). Therefore, it would have been obvious to one of ordinary skill in the art to implement thermistors as the sensors of Butler, as taught by Tsuchimoto et al., as they have been demonstrated to be acceptable temperature detectors and their locations provide adequate calibration.

Re **claim 69**, Butler, as modified by Tsuchimoto et al. and Marshall et al., teaches the limitations of claim 65 as mentioned above. Butler does teach, however, aiming the infrared camera at a blackbody whose temperature is known in order to correct for non-uniformities amongst the detector elements (para. 0096) but is silent with regards to origin of the blackbody. Butler also teaches employing a shutter (para. 0104). The blackbody of Butler inherently requires the emissivity to be substantially approaching one (see discussion of claim 65 above).

Re **claims 71 and 78** Butler, as modified by Tsuchimoto et al. and Marshall et al., teaches the limitations of claim 62 and 74, as mentioned above. Butler further discloses wherein the uncooled detector comprises a microbolometer array (para. 0028) where it follows that bolometers used in thermal cameras may include microbolometers.

Art Unit: 2884

Re **claim 77**, Butler, as modified by Tsuchimoto et al. and Marshall et al., teach the limitations of claim 74, as mentioned above. Butler further discloses wherein the IR sensor array is operable to provide a two-dimensional image (para. 0039-0040).

Re **claim 79**, Butler discloses a method for correcting a response to an unshielded radiometer in accordance with temperature measurement (para. 0028, 0031), said radiometer comprising an array of infrared sensor for providing an image in response to form a temperature image in accordance with IR radiation impinging on said IR sensor's field of view (para. 0028, 0039-0040), and a shutter, for controllably obscuring said FOV (para. 0104), the method comprising:

performing non-uniformity corrector, associated with said detector, operable to perform non-uniformity correction on output of said arrays to provide uniform outputs having a uniform response to energy detected at said uncooled sensor (para. 0028-0029).

As Applicant correctly notes, Butler does not teach a separate function with the calibrator that corrects the object temperature further by incorporating a temperature measurement by a sensor on the shutter and imaging the shutter. Instead, Butler uses the shutter information to correct non-uniformities amongst the detector elements.

In a similar field of endeavour, Tsuchimoto et al. disclose calibrating an infrared detector array by implementing a calibrator to carry out periodic calibrations (col. 9, lines 15-25) of a temperature of a shutter of said camera while said shutter is closed, using a first temperature located on said shutter (col. 7, lines 30-35) and to derive from said at least one calibration temperature measurement a reference temperature indicated of radiated energy not from an external scene (col. 8, lines 7-60) and a reference level comprising a reference level comprising an average video signal of the said IR sensors at the time of said calibration measurement (col. 9, lines 20-30), and to calculate

Art Unit: 2884

a temperature of objects in said camera's field as a function of said calibration measurements where the reference temperature serves as an offset (col. 9, lines 50-55).

Tsuchimoto et al., however, do not explicitly disclose implementing an average video signal of the sensor array. Tsuchimoto et al. disclose the sensor measuring the radiation that does not come from the scene or the shutter in order to correct for output signals (col. 9, lines 20-30). The radiation measurements are disclosed generally as an output Q that used in the offset corrections (col. 7, lines 55-65; col. 8, lines 15-60). Since this output represents the entire sensor array and represents the temperature of the internal camera parts (as in the Instant Application), the skilled artisan would consider such an output to represent the average output of the sensor. . Furthermore, Tsuchimoto et al. disclose placing the shutter between the camera optics and said detector (Figure 1). Alternative mathematical operations of the pixel outputs (subtraction, addition, etc) would not accurately represent the sensor output relating to radiation not from the scene.

Alternatively, in a similar field of endeavour, Marshall et al. disclose calculating an offset to be used in calibration to account for temperatures within the camera by averaging the signals of the detector array (col. 14, lines 58-64). The skilled artisan would have been motivated to implement averaging the video signals of Marshall et al. in the method Tsuchimoto et al. in order to provide the reference level of the camera that accounts for the interior of the camera.

In *KSR*, the court held that application of a known technique to a piece of prior art ready for improvement yields obvious predictable results. *KSR Int'l. Co. v. Teleflex* 82 USPQ2d 1385, 1396 (US 2007). The skilled artisan would look to the teachings of Tsuchimoto et al. in the apparatus of Butler in order to further correct errors in temperature measurements by the infrared detectors of an external scene. The application of the Tsuchimoto et al.'s calibration is a known technique that is recognized as part of the ordinary capabilities of one skilled in the art so that both non-uniformity

Art Unit: 2884

corrections as well as ambient temperature/sensor measurements may be used to calculate the actual temperature of an external scene. Butler further discloses using a same signal function for each of said sensors (para. 0057, 0068, 0026-0027).

Re **claim 80**, Butler, as modified by Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 79, as mentioned above. Tsuchimoto et al. further disclose determining a time dependent response of said radiation sensor to said temperature of said shutter and using said time-dependent response in modifying said temperature calculations in between determinations of said reference temperatures (col. 10, lines 10-45).

Re **claim 84**, Butler, as modified Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Butler further discloses measuring a respective second reference temperature during an external temperature measurement using s second sensor located on a housing of said camera, wherein said respective second reference temperature is a further parameter of said signal to temperature function for said external temperature measurement (para. 0026-0027, 0035).

4. **Claim 70** is rejected under 35 U.S.C. 103(a) as being unpatentable over Butler (US 2002/0074499; published June 20, 2002) in view of Tsuchimoto et al. (US 5,994,701; published November 30, 1999), and Marshall et al. (US 6,515,285; filed February 11, 2000), as applied to claim 62, and further in view of Everest (US Patent No. 4,907,895; published March 13, 1990).

Butler, as modified by Tsuchimoto et al. and Marshall et al., teach the limitations of claim 62, as mentioned above, but do not teach the shutter to be reflective. In a similar field of endeavour, Everest teaches coating at least part of the internal side of a shutter so that it highly reflective (i.e. has a reflectivity substantially approaching 1) to the infrared radiation generated by the sensor. This

Art Unit: 2884

allows for the shutter to act as a mirror to the sensor so that it may be able to detect radiation resulting from the detector and not from the field of view (col. 3, lines 13-18; col. 4, lines 52-67; col. 5, lines 10-15). It would have been obvious to one of ordinary skill in the art for the shutter to comprise a material that may reflect radiation indicative of the uncooled detector, as taught by Everest, in the apparatus of Butler, as modified by Tsuchimoto et al., in order to eliminate erroneous signals due to heating of the detector.

5. **Claim 81** is rejected under 35 U.S.C. 103(a) as being unpatentable over Butler (US 2002/0074499; published June 20, 2002) in view of Tsuchimoto et al. (US 5,994,701; published November 30, 1999), and Marshall et al. (US 6,515,285; filed February 11, 2000), as applied to claim 79, and further in view of Frey (US Patent No. 5,925,875; published July 20, 1999).

Butler, as modified by Tsuchimoto et al., teach the limitations of claim 79, as mentioned above but are silent with regards to filtering the image signal in order to compensate for modulated transfer function effects. In a similar field of endeavour, Frey teaches using a high pass filter in conjunction with a focal plane array in order to remove the unwanted temporal noise and fixed pattern noise components of an image signal (i.e. MTF effects) (col. 5, lines 50-61; col. 6, lines 45-65). One of ordinary skill in the art would have been motivated to implement the filtering of Frey in the method of Butler, as modified by Tsuchimoto et al., in order to remove noise components of an image.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2884

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YARA GREEN whose telephone number is (571)270-3035. The examiner can normally be reached on Monday - Thursday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Porta/
Supervisory Patent Examiner, Art Unit

Application/Control Number: 10/567,438

Page 12

Art Unit: 2884

2884

Yara B. Green
/YBG/